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Legal and Technical Commission

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Evaluation of the annual reports submitted by contractors

Report and recommendations of the Legal and Technical Commission

I. Introduction

1. The Legal and Technical Commission has reviewed the 2014 annual reports received from the contractors. Pursuant to section 10 of annex IV to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area, section 10 of annex 4 to the Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area and section 10 of annex IV to the Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area, all contractors are under the obligation to submit their annual activity reports by the end of March each year.

2. The contractors for polymetallic nodules are: China Ocean Mineral Resources Research and Development Association (China); Deep Ocean Resources Development (Japan); Interoceanmetal Joint Organization (Bulgaria, Cuba, Czech Republic, Poland, Russian Federation and Slovakia); the Government of the Republic of Korea; Yuzhmorgeologiya (Russian Federation); the Government of India; the Institut français de recherche pour l'exploitation de la mer (France); the Federal Institute for Geosciences and Natural Resources of Germany (Germany); Global Sea Mineral Resources (Belgium); Nauru Ocean Resources Incorporated (Nauru); Tonga Offshore Mining Limited (Tonga); and UK Seabed Resources Limited (United Kingdom of Great Britain and Northern Ireland).

3. The contractors for polymetallic sulphides are: China Ocean Mineral Resources Research and Development Association; the Institut français de recherche pour l'exploitation de la mer; the Government of the Republic of Korea; and the Ministry of Natural Resources and Environment of the Government of the Russian Federation.

4. The contractors for cobalt-rich ferromanganese crusts are: China Ocean Mineral Resources Research and Development Association; and Japan Oil, Gas and Metals National Corporation (Japan).

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5. Section II of the present report contains the Commission's analysis of and observations on the annual reports.

General comments

6. The majority of the reports largely follow the general format prescribed by the Commission and are confined for the most part to work carried out during the reporting year under consideration, in accordance with the suggestions made by the Commission following evaluations in previous years. While the average quality of reports is improving, there remains a need for contractors to further improve reporting on resource assessment and environmental baseline data. Furthermore, a few reports were limited to reviewing work that had been carried out in earlier years.

7. Six contractors are entering the last year of the final five-year phase of their contracts. By the end of that period, it is expected that they will have identified a first-generation mine site, obtained good baseline environmental data and developed a mining system prototype and arrangements for metallurgical processing. It is likely that these contractors will request extensions of their plans of work. Five of them have reported different stages of mining tests and siting in their respective areas. Several are now acquiring high resolution bathymetry collected by deep-towed systems, knowledge of the sea floor morphology being of utmost importance to the design and development of the collector systems.

8. The Commission noted concerns over the quality of a number of the annual reports and, in particular, the fact that some contractors had failed to observe the Commission's recommendations for the assessment of the possible environmental impacts of exploration for marine minerals in the Area and to provide adequate data in the appropriate format (see ISBA/19/LTC/8). Specific details of such failures were provided to the Secretary-General. The Commission requested the Secretary-General to take up those issues with the contractors and report to the Commission at its following meeting. The Commission also wished to remind contractors of their obligations under sections 13.2 (b) and (e) of annex IV to their contracts to comply with the rules, regulations and procedures of the Authority and to observe the recommendations issued by the Commission, as well as of the consequences of non-compliance.

9. The Commission noted that, at present, there existed few examples of any collaborative work among contractors, even though several contractors had mentioned the usefulness of the taxonomy standardization workshops organized by the Authority in Germany in 2013 and the Republic of Korea in 2014.

Exploration work

10. Annual reports by most contractors are directly related to fieldwork carried out in the reporting year. A total of 18 cruises were conducted by contractors in 2014, amounting to 880 days at sea. In spite of this, there remains a lack of raw tabular data in digital format.

11. A positive development observed during the reporting period is that one of the contractors has started analysing data on the economic feasibility of nodule mining.

12. Some are also providing information on mineral resource classification following mining industry practice.

Mining tests, mining technology and metallurgical processes

13. Progress still remains to be made on technology-related issues; nonetheless, several contractors for polymetallic nodules are working on the development of mining systems and metallurgical processes. For polymetallic sulphides and cobalt-rich ferromanganese crusts, those systems and processes will be developed at a later stage.

Environmental monitoring and assessment

14. The environmental work reported by contractors in 2014 is improving, but there are still great differences among contractors in the quality and amount of reported data. Some contractors have provided detailed, high-quality data focused on operational needs, while others have produced only marginal data, which are unlikely to be used in baseline studies. Hardly any biological data are reported at the species level, notwithstanding the recommendations of the Commission in its guidance for contractors (see ISBA/19/LTC/8). In many cases, no replicated sampling was done. Poor planning of environmental surveys is evident in some cases. Some contractors lack appreciation of the importance of sample design (size, sample number and stratified random sampling) to address environmental heterogeneity, as detailed by the Authority at its taxonomy and sampling standardization workshops.

15. There is still a lack of raw tabular data provided by many contractors. Only five contractors have provided digital tabulated data for polymetallic nodules. One contractor has provided data for polymetallic sulphides and one for cobalt-rich ferromanganese crusts. Those raw tabular data are essential for evaluating the potential impacts of mining on the marine environment and for the development of the Authority's regional environmental management plans.

16. Contractors are reminded that prior environmental impact assessments must be agreed with the Authority before dredging or other potentially harmful sampling activities are conducted in sulphide and crusts exploration areas. Contractors are required to verify and report that their activities in those areas have caused no serious harm to ecosystems.

Financial statements

17. Most of the contractors provided itemized financial statements, as recommended by the Commission in its guidance for contractors (see ISBA/15/LTC/7). Such a breakdown is needed to conduct an evaluation of the reported expenditure and to confirm compliance with the contract. Most contractors incurred expenditure above the minimum expenditure stated in their work programmes.

Training programme

18. Training programmes were conducted by the Federal Institute for Geosciences and Natural Resources of Germany and China Ocean Mineral Resources Research and Development Association in 2014. Daniel Armando Pérez-Calder (Mexico) and Khaled Sinoussy Mohamed (Egypt) participated in the Federal Institute's programme. China Ocean Mineral Resources Research and Development Association provided four at-sea training opportunities, although only three candidates were able to take part, as one withdrew at the last minute. It is

regrettable that such an opportunity was lost. Training reports were received from all the trainees mentioned above.

19. China Ocean Mineral Resources Research and Development Association also supported the implementation of the Southwest Indian Ridge at-sea training programme, which was partially financed by the Authority's Endowment Fund for Marine Scientific Research in the Area. In addition to its training obligations under its contract, Nauru Ocean Resources Incorporated provided training to candidates from developing States in environmental science and engineering at the University of the South Pacific, in Fiji.

II. Evaluation of annual reports and recommendations

A. Polymetallic nodules

1. China Ocean Mineral Resources Research and Development Association

20. The contractor submitted its annual report on 31 March 2015, in Chinese and in English. The report contains the following sections: executive summary; exploration and studies; environmental surveys and research; studies of mining technology; research and development of metallurgical processing technology; prospect analysis for commercial exploitation of the nodules; other activities; training; financial statement; working plan for 2015; and three annexes. It also includes a response to the Commission's comments on the previous year's annual report.

21. Exploration activities in 2014 were carried out in accordance with the programme presented in the annual report for 2013. The Commission welcomes the development of the Ocean Data Centre.

22. Deck photographic coverage (ranging from 1.4 to 80 per cent) is reported, but the validity of the method needs to be ascertained. No raw biological data are provided in the report, only summary graphs. Information is rarely at the species level and most of the data relate to higher taxa (such as classes and orders). No replicate samples were obtained at any of the stations. Most of the information concerns phytoplankton in the euphotic zone, and a very small amount of useful information was collected on the megafauna of the seafloor. No information is provided on macrofauna, meiofauna, microfauna, nodule fauna and demersal scavengers, notwithstanding the recommendations of the Commission in its guidance for contractors. Likewise, the analysis of the zooplankton community structure and biodiversity was carried out in the upper water column, with little explanatory power for the seabed. Although the titles of some figures in the report refer to "plankton species distribution", it remains unclear whether actual species determinations were made for creating those pie charts.

23. From a legal perspective, the obligations under regulation 32 (Environmental baselines and monitoring) and annex IV (Standard clauses for exploration contract), sections 5.3, 10.2 (a), 10.3 and 13.2 (b) and (e), have not been adequately fulfilled.

2. Deep Ocean Resources Development

24. The contractor submitted its annual report on 7 April 2015, in English, in hard copy and on CD-ROM. The report is subdivided into the following sections: general description of activities in 2014; exploration activities; environmental studies; mining test and available mining technology (mining system); mining test and applicable mining technology (metallurgical processing system); training programme; financial statements; and survey plan for 2015.

25. The contractor responded to the recommendations made by the Commission in 2014.

26. Exploration activities in 2014 were carried out in accordance with the programme presented in the annual report for 2013.

27. The report contains no raw data for any environmental parameters, only summary graphs. Information is not species-specific, but usually at the level of classes and orders. No replicate samples were obtained at any of the stations. The extent to which the difference between the two areas was due to inter-annual variation (e.g. in sampling) remains unclear. The standard deviation appears to have been a more appropriate measure of variance than the standard error used. No statistic tests were performed. Findings related to the benthic fauna are discussed briefly, with intra-site variation being greater than between sites. Furthermore, the contractor provides an interesting interpretation of its findings, namely that "the differences in the macrofaunal abundance in these two areas were greater than the differences in the meiofaunal abundance. Thus, it can be suggested that the bacterial, meiofaunal and macrofaunal abundances were larger in the Japan deep-sea impact experiment area than in the high abundance area". Statistical comparisons should be carried out with published data from similar areas.

28. The work performed in 2014 followed well the calendar established. The report also includes a good study on the covariation between topography, nodule abundance and nodule characteristics.

29. There has been significant development in the mining system concept. It would be useful to have an estimate of the cost of having several collector systems operating simultaneously.

3. Interoceanmetal Joint Organization

30. The contractor submitted its annual report on 31 March 2015, in hard copy and on CD-ROM. The report is subdivided into the following sections: introduction; contract-related activities (geological exploration, environmental research, technology of nodule mining and transport, technology of nodule processing and other activities); expenditure incurred while implementing contract-related activities in 2014; list of publications; and three annexes. The submission of data in GIS format is much appreciated.

31. No species-specific raw data are provided and no biological findings are listed or quantified in the report. No information was collected on demersal scavengers. The sampling method of extracting five subsamples from the same box corer (as illustrated in a figure of the report) is likely to render them not statistically independent from one another, which is something that needs to be taken into account when estimating the variance in nematode numbers, for example.

32. Exploration activities in 2014 were carried out in accordance with the programme presented in the annual report for 2013. The Commission welcomes the statement on the non-confidentiality of the report as well as the good development of technology validation and processing.

4. Government of the Republic of Korea

33. The contractor submitted its annual report on 7 April 2015, in hard copy and on CD-ROM. The report is subdivided into the following sections: summary; exploration work; environmental studies; mining test; training programme; financial statement; adjustments to the programme of activities; other activities; and outcomes of activities carried out in 2014.

34. Exploration activities in 2014 were carried out in accordance with the programme presented in the annual report for 2013.

35. The Commission commends the structure and clarity of the report, which includes a good simulation of the computational fluid dynamics linked to the mining devices and of processing technology.

36. The Republic of Korea is getting new bathymetric and side-scan sonar data from a deep-towed device, achieving resolution better than 5 m. It would be useful to learn whether the seabed topography is suitable for the envisaged operation of the collector system.

37. No species-specific raw data on polychaetes are provided, only very general information on higher-taxa macrofaunal and meiofaunal sampling on the "metadata sheets for use with annual report data" submitted on CD-ROM. No replicate samples appear to have been collected at any of the stations. No information was collected on megafauna, microfauna, nodule fauna and demersal scavengers. Few taxa besides nematodes, copepods and polychaetes appear to have been quantified.

5. Yuzhmorgeologiya

38. The contractor submitted its annual report in Russian on 31 March 2015 and in English on 8 May. The report is subdivided into the following sections: introduction; exploration activities; environmental studies; mining technology development; metallurgical process development; research activities; training programme; financial statements; and programme of activities for 2015.

39. Exploration activities in 2014 were carried out in accordance with the programme presented in the annual report for 2013.

40. The report contains a good informative description of the laboratory studies.

41. It is stated in the report that the contractor has started to design deep-water instrumentation necessary for exploration activities. Work has also started on the development of a prototype of multichannel towed abyssal system for seabed mapping, sub-bottom profiling, the evaluation of ore parameters and the geological conditions of the localization of nodule deposits. It would be useful to learn about the extent to which the exploration programme depends on the use of that prototype.

42. According to the report, no species-specific raw data and no replicate samples were obtained at any of the stations. No information was collected on demersal scavengers. The sums provided for macrofaunal and meiofaunal specimens do not

always add up. Furthermore, the smallest mesh sizes of the sieves do not correspond to the ones recommended by the Commission. Bearing those limitations in mind, the baseline data for 4,240 km2 area appear comprehensive. Nonetheless, it begs the question of what baseline data have been collected for the remaining 94.35 per cent of the license area.

43. From a legal perspective, the obligations under regulation 32 and annex IV, sections 5.3, 10.2 (a), 10.3 and 13.2 (b) and (e), have not been adequately fulfilled, and the recommendations of the Commission in its guidance for contractors (ISBA/19/LTC/8) have not been complied with.

6. Government of India

44. The contractor submitted its annual report, in English, in digital format on 30 March 2015 and in hard copy and on CD-ROM on 15 April. The report is subdivided into the following sections: introduction; surveys and exploration; environmental impact assessment study; technology development (mining); technology development (metallurgy); expenditure; and publications.

45. The biological subsampling method used by the contractor produces samples that are too small to provide any statistically significant data (see also the Commission's remarks on the previous annual reports, in which the standard deviation was much larger than the mean to which it applied). Furthermore, the mesh sizes of the sieves do not correspond to those recommended by the Commission in its guidance for contractors (ISBA/19/LTC/8). No species-specific raw data are provided and no replicate samples were obtained at any of the stations. No information was collected on megafauna, microfauna, nodule fauna and demersal scavengers.

46. As discussed at the Authority's macrofaunal taxonomy standardization workshop held in the Republic of Korea in November 2014, sampling with a box corer and then subsampling with a corer with a diameter of just 12.5 cm cannot yield information with sufficient statistical power for use in scientific studies and to monitor the impacts of mining and the subsequent recovery of deep-sea ecosystems. This is due to the exceptionally low abundance of macrofauna in abyssal sediments, especially in oligotrophic and mesotrophic waters. In such waters, low productivity at the sea surface causes low abundance and biomass on the deep seafloor below. In order to generate sufficient data, whole box cores must be used, and a large number needs to be collected to estimate spatial variability. None of the work undertaken by the contractor to date in all the years of the current licence appears to meet the standards recommended at the Authority's workshops and by the Commission, or other scientific standards for macrofaunal sampling in the oceans. A radical change in how biological sampling is carried out by the agencies of the Government of India is required.

47. In its guidance for contractors, the Commission recommends the use of 250-µm sieves for macrofaunal sampling (see ISBA/19/LTC/8, annex I, para. 36 (b)). This is because macrofauna from abyssal sediments, especially in oligotrophic and mesotrophic areas, is generally much smaller than macrofauna found in eutrophic abyssal sediments and in shallower water. A 250-µm sieve has to be used, as agreed at the Authority's workshop on macrofaunal taxonomy standardization. Detailed advice on how to collect, process on board and identify macrofaunal samples was also discussed at the workshop. To date, none of those have been adopted by the

Government of India. Furthermore, in its guidance for contractors, the Commission recommends the use of 32-µm sieves for the sieving of meiofauna samples (see ISBA/19/LTC/8, annex I, para. 36 (c)), which is an international scientific sampling standard.

48. The meiofaunal abundances that have been recorded are of an order of magnitude lower than those found in similar oligotrophic sediments in the Clarion-Clipperton zone. The differences are so great that they are unlikely to be related to the environment and more likely to be the result of sampling efficiency and sample processing (e.g. sieve size). The greatest abundances of meiofauna in the sample with the coarsest sediments would also indicate a sample processing problem. Therefore, all sample data should be compared with published values and mean values should be expressed in relation to a measure of their variation (standard deviation).

49. The report shows good development in the in situ measurement of the seabed soil properties and interesting results of metallurgical processes.

50. From a legal perspective, the obligations under regulation 32 and annex IV, sections 5.3, 10.2 (a), 10.3 and 13.2 (b) and (e), have not been adequately fulfilled, and the recommendations of the Commission in its guidance for contractors (ISBA/19/LTC/8) have not been complied with.

7. Institut français de recherche pour l'exploitation de la mer

51. The contractor submitted its annual report on 31 March 2015, in French, in hard copy and on CD-ROM. The report is subdivided into the following sections: introduction; exploration; environmental monitoring and evaluation; extractive techniques and metallurgical processes; financial statement; and two annexes.

52. The Commission welcomes the first estimation of the nodules resource at the scale of the exploration area and following the conclusions of the workshop held in Goa, India. Given the status of inferred results, it would be useful to learn about the future strategy to improve the resource assessment.

53. The biological data mentioned in the annual report are either old or available only outside the frame of the contract. There appears to be no new data on megafauna, macrofauna, meiofauna, microfauna, nodule fauna and demersal scavengers. No species-specific raw biological data are provided, and very few biological results are listed or quantified. For results, it is not acceptable to refer simply to scientific publications, some of which are not even submitted. The status of the samples and the quality of the data remain unclear. The contractor is strongly advised to relate its results to actual operational needs.

54. From a legal perspective, the obligations under regulation 32 and annex IV, sections 5.3, 10.2 (a), 10.3 and 13.2 (b) and (e), have not been adequately fulfilled.

8. Federal Institute for Geosciences and Natural Resources of Germany

55. The contractor submitted its annual report on 31 March 2015, in English, in hard copy and digital format. The report is subdivided into the following sections: general remarks; exploration work; environmental studies; mining tests and proposed mining technologies; training programme; exploration expenditure; publications; and two appendices.

56. Responses to the Commission's questions were provided. The contractor explained that it did not own the environmental data presented in its annual report for 2013. The Commission therefore feels that those data cannot be presented as results achieved by the contractor under the exploration programme.

57. Exploration activities in 2014 were carried out in accordance with the programme presented in the annual report for 2013. The Commission welcomes the structure and clarity of the report.

58. The interaction and cooperation with different international programmes is appreciated.

59. The contractor states that 575 nodules from 175 box core sites were analysed, representing on average 3.3 nodules per site. It would be useful to learn whether this is considered representative of the nodule composition at each site.

60. The contractor responded to the recommendations made by the Commission in 2014. However, the sieve mesh size for macrofauna does not correspond to that recommended by the Commission in its guidance for contractors (ISBA/19/LTC/8). Furthermore, the contractor states that increased sampling effort and stronger replication are required to produce more accurate estimations of geographic ranges and species diversity.

61. From a legal perspective, the obligations under regulation 32 and annex IV, sections 5.3, 10.2 (a), 10.3 and 13.2 (b) and (e), have not been adequately fulfilled, and the recommendations of the Commission in its guidance for contractors (ISBA/19/LTC/8) have not been complied with.

9. Global Sea Mineral Resources

62. The contractor submitted its annual report on 31 March 2015, in English, in hard copy and on CD-ROM. The report of about 800 pages is subdivided into the following four parts: (a) general report describing the content, comparison of the initial programme, financial overview and summary of the training programme for year two; (b) consolidation of the historical data; (c) data report on the upper water column and record of tropical cyclones in 2014; and (d) geophysical data report (exploration work during 2014). Throughout its report, the contractor uses terms such as "concession" and "harvesting" that should be substituted with the appropriate terms.

63. The first exploration cruise in the area of the Global Sea Mineral Resources was performed only in 2014. It would be useful to learn about the impact of this delay on the schedule foreseen in the exploration programme for the first five-year period under contract.

10. Nauru Ocean Resources Incorporated

64. The contractor submitted its annual report on 30 March 2015, in English. The report is subdivided into the following sections: exploration programme objectives; exploration work; environment; mining tests, engineering and metallurgy; training; and financial statement.

65. According to the report, the data from the Authority's Reserved Areas contain only a small number of anomalous values that may be suspected to be erroneous (4 out of 2,212 data points). The detailed information provided on climate, the work

covered in the previous annual report, sample preparation and analytical methods appear excessive. No biological sampling of any sort appears to have been done in 2014.

66. Nauru Ocean Resources Incorporated has made a first analysis of the potential of ocean thermal energy conversion to generate electricity during future polymetallic nodule mining.

11. Tonga Offshore Mining Limited

67. The contractor submitted its annual report on 10 April 2015, in English, in hard copy and digital format. The report is subdivided into the following sections: executive summary; introduction; exploration work; future strategy; environmental studies; mining tests and engineering studies; metallurgical studies; conceptual costs and economic modelling; training programme; exploration expenditure; and proposed adjustments to the future programme.

68. Apart from some new designs in the mining system, it seems that there were no developments in 2014. Most, if not all, exploration results presented in the report can already be consulted in the updated NI 43-101 technical report of March 2013 that is publically available (see www.nautilusminerals.com). No biological sampling of any sort appears to have been done in 2014.

69. From a legal perspective, the obligations under regulation 32 and annex IV, sections 5.3, 10.2 (a), 10.3 and 13.2 (b) and (e), have not been adequately fulfilled.

12. UK Seabed Resources Limited

70. The contractor submitted its annual report on 31 March 2015, in digital format. It is subdivided into six sections: information regarding intended programme and its completion; cruise resource survey accomplishments in 2014 and plan for 2015; environmental baseline accomplishment in 2014 and plans for 2015; mining tests; training programme; and financial statement.

71. No work is reported on resource evaluation, environmental work, mining test or training.

72. Most of the contents of the report are based on the cruise scheduled in 2015. The Commission recalls that the contractor's application predicted a period of six years to complete the exploration programme. It would be useful to learn about the impact of the activities in 2014 on the timeline of the exploration programme.

73. From a legal perspective, the obligations under regulation 32 and annex IV, sections 5.3, 10.2 (a) and (c), and 13.2 (b) and (e), have not been adequately fulfilled.

B. Polymetallic sulphides

13. China Ocean Mineral Resources Research and Development Association

74. The contractor submitted its annual report on 31 March 2015, in Chinese and in English, in hard copy and on CD-ROM. The report is subdivided into the following sections: resource exploration and studies; environmental survey and studies; research and development of mining technology; research and development

of metallurgical processing technology; analysis of the prospects for commercial development; others; training; workplan for 2015; financial statement; and five annexes.

75. Exploration activities in 2014 were carried out in accordance with the programme presented in the annual report for 2013.

76. Out of 59 samples collected, only 2 were sulphide samples. The separate geochemical analyses of those samples are not provided in the report. The results only appear in graphs and plots.

77. No raw environmental data are provided, only summary graphs. Information is provided at the higher taxonomic levels only (phylum, class and order), instead of the species-specific level recommended by the Commission in its guidance for contractors (ISBA/19/LTC/8). Most information is on plankton in the upper water column, and very little useful information is presented on the seabed fauna. The "TV grab bucket", a grab bucket equipped with a closed-circuit television camera, appears to be suboptimal to sample macrofauna quantitatively. Some data (e.g. in tables 2.1-2, p. 32) do not relate to the contract area. It is not clear whether the *Jiaolong* submersible was used in the contract area. Details are provided only for a dive at another location. If multiple TV grab buckets were used extensively within a small area, a prior environmental impact assessment should be made to assess their cumulative impacts. Furthermore, no further dredging should occur until such an assessment has been agreed with the Authority. A specific statement that the activities of the contractor have not caused serious harm to the environment should be included in the annual report. It should be accompanied by detailed information on how this has been verified (e.g. with photographs taken from the *Jiaolong* submersible).

78. From a legal perspective, the obligations under regulation 34 and annex 4, sections 5.3, 10.2 (a) and 13.2 (b) and (e), have not been adequately fulfilled, and the recommendations of the Commission in its guidance for contractors (ISBA/19/LTC/8) have not been complied with.

14. Institut français de recherche pour l'exploitation de la mer

79. The contractor submitted its annual report on 31 March 2015, in French, in hard copy and on CD-ROM. The submission consists only of a preliminary report on the cruise organized to study biodiversity, interactions, connectivity and symbiosis in extreme environments.

80. The cruise took place from 10 January to 11 February 2014, that is before the exploration contract was signed, on 18 November 2014.

81. The report includes the review of previous, mostly environmental studies conducted in the area covered by the contract, as well as plans for future activities. It cannot be considered a full-scale annual report.

82. From a legal perspective, the obligations under annex 4, sections 13.2 (b) and (e), have not been adequately fulfilled.

15. Government of the Republic of Korea

83. The contractor submitted its annual report on 30 April 2015, in hard copy and on CD-ROM. The report is subdivided into the following sections: summary;

exploration work; environmental studies; mining tests; training programme; financial statement; and adjustments to the programme of activities.

84. Anomalies in near-bottom waters (in nephelometric turbidity, oxidation-reduction potential and dissolved methane) have been analysed for the identification of plumes of conductivity, temperature and depth. Those results are very important for the identification of polymetallic sulphide deposits and future exploration work. All data were submitted in a digital format.

85. It would be useful to know why bathymetry is discussed under environmental studies.

86. The environmental studies of 2014 did not include any biological sampling.

16. Ministry of Natural Resources and Environment of the Russian Federation

87. The contractor submitted its annual report on 7 April 2015 in Russian and on 18 May in English, in hard copy and on CD-ROM. The report is subdivided into the following sections: introduction; prospecting work; environmental study; development of mining technologies; metallurgical process; other activities; financial statement; training programme; and adjustments to the programme of activities.

88. Exploration activities in 2014 were carried out in accordance with the programme presented in the annual report for 2013.

89. The study of physical properties is considered as a mining technology activity, as the contractor states that the geotechnical parameters are very important for the development of underwater mining equipment.

90. The term "prospecting" is used, although exploration work was carried out for 181 days in 2014. From a legal point of view, exploration excludes prospecting, even though prospecting is, from a geological point of view, part of the exploration. No new biological sampling appears to have been done in 2014. While the desk study on megafauna provides useful background information, the work should be related to major environmental variables, such as depth. A prior environmental impact assessment should take place to assess the cumulative impacts of sampling activities carried out in a small area. No further dredging should occur until such an assessment has been agreed with the Authority. A specific statement that the activities of the contractor have not caused serious harm to the environment should be included in the annual report. It should be accompanied by detailed information on how this has been verified (e.g. with photographs taken from submersibles or remotely operated vehicles).

91. Dredge samples were collected at 27 sites. The report does not contain separate geochemical analyses for each of those samples. Instead, average geochemical and mineral analyses are given for the deposits being explored. The description and characterization of those deposits ("Yubileinoye" and "Surprise") are very good and informative.

92. From a legal perspective, the recommendations of the Commission in its guidance for contractors (ISBA/19/LTC/8) have not been complied with.

C. Cobalt-rich ferromanganese crusts

17. China Ocean Mineral Resources Research and Development Association

93. The contractor submitted its first annual report on 31 March 2015, in Chinese and in English, in hard copy and on CD-ROM. The report is subdivided into the following sections: resource exploration and research; environmental survey and research; research and development of mining technology; research and development of metallurgical processing technology; market analyses of the main metals; others; training; workplan for 2015; financial statement; and five annexes.

94. Exploration activities in 2014 were carried out in accordance with the programme presented in the contract for exploration for the first five-year period.

95. The existence of crusts was assessed at depths of more than 2,600 m, but it is specified that, at those depths, the crusts are not mineralized. It would be useful to know the meaning of this classification.

96. It is also indicated that mineralized crusts occur at depths above 2,500 m to 2,600 m. However, in the table that shows the main design parameters of the mining system, the contractor refers to an operating water depth of 4,500 m. It would be useful to know the rationale for this option.

97. No raw environmental data are provided, only summary graphs, and information is provided only at higher taxonomic levels (class or order), notwithstanding the request for species-specific data. Most of the collected information is on plankton in the upper water column, and no information was collected on macrofauna, microfauna and demersal scavengers. The TV grab bucket appears to be suboptimal to sample macrofauna quantitatively. A specific statement that the activities of the contractor have not caused serious harm to the environment should be included in the annual report. That statement should be accompanied by detailed information on how this has been verified (e.g. with photographs taken from the *Jiaolong* submersible). On seamounts, this should be not only in the area of activity but also downslope, as it is evident from the observations made from the *Jiaolong* that significant ecosystems occur at all depths.

98. From a legal perspective, the obligations under regulation 34 and annex IV, sections 5.3, 10.2 (a) and 13.2 (b) and (e), have not been adequately fulfilled, and the recommendations of the Commission in its guidance for contractors (ISBA/19/LTC/8) have not been complied with.

18. Japan Oil, Gas and Metals National Corporation

99. The contractor submitted its first annual report on 30 March 2015, in English, in hard copy and on CD-ROM. The report is subdivided into the following sections: summary; exploration work; environmental studies; mining tests, including metallurgy; training programme; and financial statement.

100. Exploration activities in 2014 were carried out in accordance with the programme presented in the contract for exploration for the first five-year period. Good results on the physical tests of crusts and basement rocks have been reported.

101. Much of work done during the prospecting carried out between 1987 and 2012 is presented, although legally it does not constitute a part of the exploration under

the contract with the Authority. No biological sampling of any sort appears to have been done in 2014.

102. From a legal perspective, the obligations under regulation 34 and annex IV, sections 5.3, 10.2 (a) and 13.2 (b) and (e), have not been adequately fulfilled, and the recommendations of the Commission in its guidance for contractors (ISBA/19/LTC/8) have not been complied with.